An Analysis of Examining the Relative Performance of Islamic and Conventional Banks during the Global Financial Crisis

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Abstract

This paper empirically investigated the relative performance of Islamic and conventional banks during the recent global financial crisis to test the Beck et al.'s (2013) arguments in the related literature using Yorulmaz's (2016) multidimensional financial inclusion index. Moreover, as the modification of the results in the literature, this paper aimed to explore the mechanisms by which Islamic banks provide better performance using an aggregate data for Islamic banking products during the global crisis. In the meantime, testing the results in the literature using both financial inclusion indexes and the conventional bank proxy used in the previous studies, we found evidence that Islamic banks performed relatively better during the global financial crisis period. Furthermore, as the modification of the results in the literature, we found evidence that the redistributive tools of Islamic finance such as Zakah and Mudarabah explain the mechanism of this performance during the financial crisis period.

Keywords: *Conventional Banks, Islamic Finance, Global Financial Crisis, and GMM*

JEL Codes: *G20, G21, G28, G32*

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Introduction

The relative performance of Islamic and conventional banks during the recent global financial crisis has been intensively argued in recent years. The global financial crisis has increased attention of policy makers and researchers more on the association between Islamic finance and financial stability along with the resilience nature of Islamic financial institutions during the crisis. The effect of global financial crisis on commercial bank assets was destructive. However, asset-base and risk and profit sharing nature of Islamic financial institutions shielded their clients from the destructive effects of global financial crisis. Therefore, as the common evidences in the literature have globally suggested that Islamic banks performed better during the crisis. The effects of the global crisis were larger in well-developed economies such as Europe and US while these effects were relatively smaller in less developed regions. (Hasan and Dridi, 2010).

In particular, there are three factors determined in the literature that helped to increase the stability of Islamic banks by focusing on the real practices. First, Islamic financial activities are more related to actual economic activities than commercial banks. Islamic banking services that rely on profit and loss sharing principles provide much better risk sharing opportunities. This would create a strong link between the real and the financial sector. Profit and loss sharing products such as Murabaha and Mudaraba services comprise a large share amongst other Islamic financial services. For instance, Murabaha services were 65.4 % of the total Islamic financial activities in Organization of Islamic Cooperation (OIC) member countries in 2007.

These kinds of services require determining the credit holders' real purpose of using these services and banks should hold the ownership of the asset. Hence, this would help banks to keep tracking the funds used for their actual intention and keep them tied to real sector. However, commercial banks are more flexible on choosing the clients and their intended purposes of using the funds. Finally, as the nature of these services, Islamic banks are against commodity, usufruct, and tangible assets in the future. Hence, this would help Islamic banks to prevent ballooning of debt and loans and to create a strong tie between the real and the financial sector (Syed Ali, 2011).

Second, exotic and toxic financial services which are considered as speculative investments for commercial banks and amplifying component of the global crisis are not available in Islamic banks. Before the crisis, this situation had been considered as a barrier in the Islamic banking development. However, during the crisis, it turned out to be a powerful factor for Islamic banks. Third, Islamic banks have relatively larger liquidity amounts than commercial banks. As the nature of Islamic banks, lack of

interest-free short-term transactions and risk management aims, causes excess of liquidity (Syed Ali, 2011).

Moreover, as discussed in The Economist, (2009) and El-Said and Ziemba (2009), this crisis did not affect Islamic banks because of their nature of a strong association between financial and productive investments since the main source of the global crisis was sub-prime mortgage transactions. However, Islamic banking transactions were not totally free from the impacts of global financial crisis. The global financial crisis had indirect effects on Islamic banks. In particular, some specific transactions such as Murabaha services and services that are strongly tied to real sector started to carry higher risks after the global crisis. Furthermore, the butterfly affect of the global crisis affected developing economies by decreasing their economic growth rates and trade activities. These economic restrictions in such countries which have more Islamic banks reduced the funding of these financial institutions (Beck et al. 2013).

This paper attempted to test Beck et al.'s (2013) argument in the literature by exploring the impact of recent global financial crisis comparing Islamic and conventional banks with new interaction variables for crisis periods using the Arellano & Bond (1991) GMM estimation model. The disaggregated data on Islamic banking products were also used in this paper to assess the mechanisms by which the relative performance of Islamic banks occured.

In this paper, Section 2 identified the basics of Islamic financial institutions. Section 3 explained some literature review. Section 4 determined the data used in this paper. Section 5 showed the methodology used in this study. Section 6 explained the empirical results of the models, and finally section 7 concluded the paper.

2. Islamic Finance

The Islamic finance has two dimensions: First, the Islamic Law promotes financial transactions using risk-sharing contracts which are used as an alternative to conventional finance. Second, Islamic finance promotes financial transactions through redistribution of the wealth instruments (Iqbal and Mirakhor, 2012). The risk-sharing instruments are Islamic microfinance, Islamic SME financing and micro insurance, and Shari'a-compliant deposits and/or savings accounts which operate under Mudaraba (profit sharing) principle. These financial instruments are called profit and loss sharing principles. This means that financial instruments operate under the principle of no interest gain for account owners. However, account owners share the overall profit or loss of an Islamic financial institution (Demirguc-Kunt and Klapper, 2013). In the meantime, the redistributive instruments are classified as Zakah, Sadakat, Qard-al-hassan, and Waqf which aim the disadvantaged groups to establish social

equity in society. These instruments are more like mandated levies according to the Qur'an (Mohieldin, Iqbal, Rostom and Fu, 2011).

The first redistributive instrument, Zakah, as explained above, simply refers to a wealth distribution cycle where the rich and the poor are the main players. According to Shari'a Law, a wealthy person, who gains more than what he consumes must share this residual amount with the poor in society. Zakah is expressed as a wealth tax which is calculated according to a person's level of net worth. In order to encourage capital investment and house ownership, Shari'a excludes business capital and housing from Zakah taxation. At this point, it must be noted that Zakah is totally different from general government taxation; it is based on the basis of willingness if Muslim groups fulfill the Islamic Law.

The second redistributive instrument, Sadaqah, refers to voluntary social spending in order to eradicate poverty in society as the Qur'an required. The third instrument, Qard-al-hassan, is a voluntary loan which does not have any interest or any expectation of return from the borrower as government subsidy. It is the borrower's responsibility to repay the loan but the well-off creditor does not ask the needy borrower to pay off the debt at a certain time.

Finally, Waqf (endowment) is voluntarily donating properties such as land or buildings for philanthropic purposes in society (Askari, Iqbal, Krichene, and Mirakhor, 2012). All those levies are different from general charity tools because, according to the Qur'an, these are required, and there will be multiple returns of these levies in an increasing rate as a reward from God.

3. Literature Review

Scholars and policymakers have started to give much attention to the growth of the Islamic finance and Shari'a-compliant financial services. Beck et al. (2013) suggested that during the recent global financial crisis, Islamic finance institutions performed relatively better than conventional finance institutions because of the higher capitalization and liquidity particularly in Muslim countries.

The global financial crisis has increased attention of policy makers and researchers more on the association between Islamic finance and financial stability along with the resilience nature of Islamic financial institutions during the crisis. They commonly argued the relative performance of both Islamic and conventional banks during the global financial crisis. Since the impact of global financial crisis on commercial bank assets was more destructive, asset-base and risk and profit sharing nature of Islamic financial institutions shielded their clients from the destructive effects of global financial crisis. Thus, as the common practices showed in the literature, Islamic banks

performed relatively better than conventional banks during the crisis (Beck et al. 2013; Syed Ali, 2011; Hasan and Dridi, 2010).

In particular, Syed Ali (2011) empirically explored the reasons of the relative performance of Islamic banks during the global financial crisis. Accordingly, the first reason is the association of Islamic banking activities between real economic activities. This strong association comes from the nature of Islamic banking transactions such as profit and loss sharing principles which provide much better risk sharing opportunities for clients. Second, exotic and toxic financial services which are considered as speculative investments for commercial banks and amplifying component of for the global crisis are not available in the Islamic banks. Third, Islamic banks relatively have larger liquidity amounts than commercial banks. This larger liquidity is the consequences of risk management purposes of Islamic banks.

Similarly, Mat Rahim and Zakaria(2013) found that Islamic financial institutions were relatively unharmed during the 2007-2008 global financial crisis in Malaysia. They claimed that Islamic financial institutions were more stable than conventional banks. Furthermore, Zehri and Al-Herch (2013) found that Islamic Banks tended to be more stable and immunized against shocks because of the Shari'a system. On the other hand, Miah and Sharmeen (2015) analyzed the association between capital risk and efficiency of Islamic and conventional banks of Bangladesh. They found that conventional banks were relatively better at managing cost in Bangladesh. Furthermore, Rahman and Kassim (2017) claimed that Shari'a-compliant financial products could not be able to stand strong against the fiscal shocks during the 2007-2008 global financial crises in Malaysia.

Moreover, The Economist (2009) and El-Said and Ziemba (2009) argued that Islamic banks were not affected by sub-prime mortgage transactions which are the main component of the global financial crisis because of their nature of a strong association between financial and productive investments. Finally, Hasan and Dridi (2010) empirically suggested in their paper that Islamic banks affected from global financial crisis differently from conventional banks. Islamic banking factors such as business model helped to hold the impacts of global crisis on profitability in 2008. However, some Islamic banks faced larger profitability decline in 2009 because of their inability of risk management activities. Furthermore, Islamic banks performed better in asset and credit growth than conventional banks during the crisis period.

4. Data

We used a sample of countries having both commercial and Islamic banks to assess the relative performance of those bank types during the crisis. As it can be seen from Table 4.1, following Beck et al. (2013), in order to construct and examine different indicators of all banks such as business orientation and stability, we use data from both Bankscope and World Bank's Financial Development Database for the period from 2004 to 2011. We used various variables to compare conventional and Islamic banks during the global financial crisis period. In particular, we used equity asset ratio, return on assets, return on equity, Z-scores, and finally, loans to deposits ratio to compare the relative performance of Islamic and commercial banks during the recent global financial crisis period (Beck et al. 2013; Syed Ali, 2011). It is suggested in the literature that these are relatively better indicators to compare both types of banks in the models since these indicators were affected more from contagion effects. Moreover, loan-deposit ratio let us measure the '(dis-) intermediation trends' across both types of banks during the recent global financial crisis period (Beck et al. 2013).

In the meantime, in order to test Beck et al.'s results, we used constructed financial inclusion index of Yorulmaz (2016) as the proxy for financial inclusion along with the proxies that Beck et al. used. Regressing these proxies both separately and all together in different regressions, we compared the results to test the constructed financial inclusion index. Beck et al.'s conventional bank access proxies, total assets, non-learning assets, and fixed assets were constructed from World Bank's Financial Development Database and Bankscope. Finally, as the modification of the results in Beck et al. (2013), we used aggregate data for specific Islamic bank products to examine the mechanisms of the relative performance of Islamic banking during the global financial crisis.

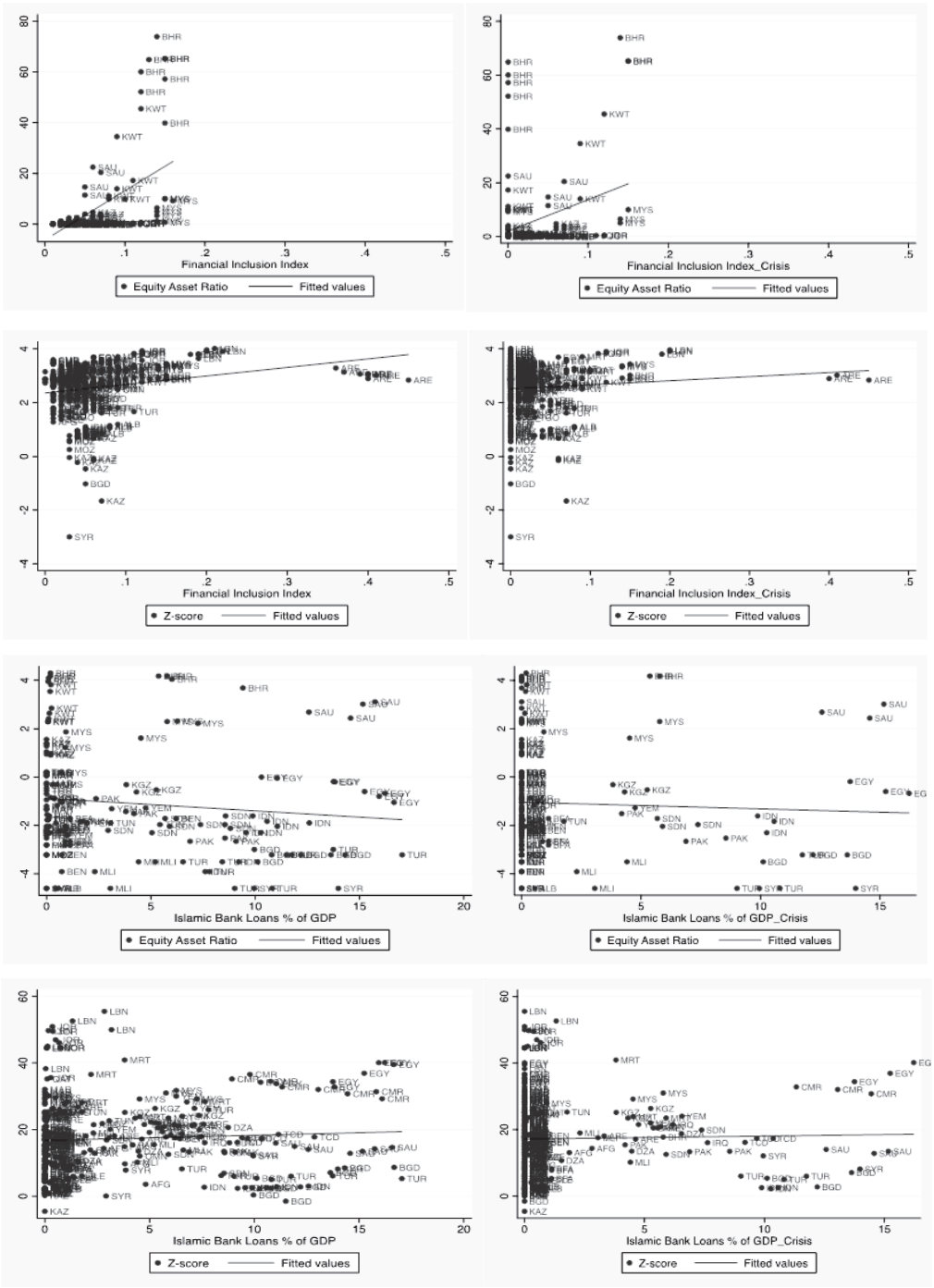
Subdividing the products of Islamic financial institutions allowed us to assess the mechanism by which Islamic finance provided a better service or vice versa in this paper. First, we compared the business orientation of commercial and Islamic banks during crisis period using loan-deposit ratio. The loan-deposit ratio varied from 9% to 368% in our sample. Second, we used several bank stability indicators such as z-score. The z-score shows the measure of bank stability and explores the level of insolvency. Higher level of z-score represents the higher the level of bank stability (Beck et al. 013). The z-score varied from -5% to 56% in this sample. Finally, we used two components of the z-score such as return on assets and return on equity in this paper.

Variable	Obs	Mean	Std. Dev.	Min	Max
Equity-Asset Ratio	162	4.901	13.943	0	74
Return on Asset (ROA)	326	1.594	3.380	-51	21
Return on Equity (ROE)	326	15.806	17.791	-89	241
Z-score	326	17.262	11.329	-5	56
Loan-deposit	316	79.980	41.105	9	368
Financial Inclusion Index	336	0.059	0.068	0	0
Banking Crisis Dummy	336	0.381	0.486	0	1
Islamic Banking Dummy	928	0.440	0.497	0.000	1
Zakah % of GDP	335	0.072	0.713	0	9
Financial Inclusion Index_Crisis	336	0.023	0.052	0	0
Islamic Banking Dummy_Crisis	927	0.174	0.379	0.000	1
Zakah % of GDP_Crisis	335	0.019	0.338	0	6
Total Assets (Conventional banks)	287	39.159	28.935	4	143
Non-Loan Earnings Assets	167	8.257	6.433	1	31
Fixed Assets	312	71.252	18.979	32	100

Figure 4.1 explores the correlations between commercial and Islamic banking access indicators with asset quality and stability indicators during and before the crisis period. Scatter diagrams allowed us to examine the data in terms of outliers. Moving clockwise, we used the financial inclusion index as the proxy for conventional bank base access and some selected Islamic banking products in the graphs. There were some countries emerging as outliers in the data such as Bahrain, Kuwait, Kazakhstan, Syria, and Lebanon. Therefore, as the robustness check of the results, we eliminated the outliers in the data. Following the related literature, we eliminated outlier countries by winsorizing them at the 1st and 99th percentiles (Beck et al. 2013).

In particular, the financial inclusion index as the proxy for conventional bank access was positively and significantly associated with equity-asset ratio with the correlation amount of 0.121 even during the banking crisis periods. This association was even relatively better than other Islamic banking products during the crisis period. Moreover, in terms of return on assets and z-scores, Islamic banking products seemed to have better relationship than financial inclusion index during the crisis period.

Figure 4.1 Correlates of Asset Quality and Stability Variables against Islamic and Conventional Bank



5. Methodology

This paper compared commercial and Islamic banks in terms of their relative performance during the recent global financial crisis period. In doing so, it aims to examine which type of banks was better positioned against exogenous financial shocks during the crisis period by following the Beck et al. (2013)'s specification and testing their argument. We focued on the sample period from 2004 to 2011 for all indicators in this paper. Therefore, we had a panel data for countries having both bank types so that we might consider country and year fixed effects. This would allow us to control country level factors in examining the impact of financial crisis. Moreover, in order to test Beck et al. results', we used Yorulmaz's (2016) constructed financial inclusion index as the proxy for financial inclusion along with the proxies that Beck et al. used. Regressing these proxies both separately and all together in different regressions, we compared the results to test our constructed financial inclusion index.

Additionally, as the modification of the results in Beck et al. (2013), we subdivide products of Islamic banks to assess the mechanism by which the impact of Islamic finance occurs. These new variables allow us to see the mechanism whether by which Islamic finance provides a better service and in what way. In the meantime, there are high correlations between Islamic bank products and Islamic bank dummy variable. In doing so, we regress these variables one at a time in separate regressions.

Furthermore, we specifically created Islamic banking dummy and Islamic banking products interaction terms with a global financial crisis dummy to assess the impact of Islamic finance during the crisis period. This bank crisis dummy variable took value as one for the period from 2007 to 2009 for each sample country. Since we had a small time dimension and the explanatory variables are not strictly exogenous, the Arellano & Bond (1991) GMM estimation model was employed to mitigate dynamic endogeneity in this paper[1]. Thus, this estimation model allowed us to control the country and year fixed effects by first differencing and eliminates the unobserved heterogeneity of the results. The basic functional form of the regression equation is as follows:

$$Banking_{i,j,t} = \alpha y_{i,t-1} + \beta B_{i,j,t} + \gamma_1 C_i + \gamma_2 C_i * Crisis_{i,t} + \delta_1 I_i + \delta_2 I_i * Crisis_{i,t} + \eta_i + \varepsilon_{it}$$

1. Since the existing panel data was of a short time dimension (T=8), larger country dimension (N=113) and also with variables that were not strictly exogenous, The Arellano and Bond (1991) model would be the best fit for this model. This method consists of two essential steps, which are taking the first-differenced form of the model and lagged levels of the variables are uncorrelated with the error term, in terms of moment condition that the model is based on. Firstly, the differencing eliminates the potential bias, which may arise from unobserved heterogeneity. Besides, the method controls the dynamic endogeneity of the lagged dependent variable using lagged endogenous variables as instruments (Roodman, 2006).

In the equation above, $Banking_{i,j,t}$ stands for the value of the endogenous variable for country i in period t. In this paper, the dependent variables are sets of bank asset quality and stability indicators above. $y_{i,t-1}$ is the lagged dependent variable of asset quality and stability indicators. β implies the coefficient of the independent variables, and $B_{i,j,t}$ represents the matrix of independent variables. γ_2 and δ_2 allow us to measure the impacts of Islamic and conventional banks during the crisis. η_i is the unobserved country fixed effects, and ε_{it} is the general stochastic term.

6. Empirical Results

In order to test the impact of the financial inclusion index as the proxy of financial inclusion, we perform financial inclusion index only, Beck et al.'s conventional bank indicators only, and all indicators' regression equations separately in different tables. Thus, Tables 6.2, 6.3, and 6.4 indicate all these scenarios to test the impact of our constructed financial inclusion index.

Table 6.2 Comparing Islamic and Commercial Banks during Global Financial Crisis-Financial Inclusion Index only Regressions

The dependent variables are Equity Asset Ratio in columns (1) and (2), Return on Assets in columns (3) and (4), Return on Equity in columns (5) and (6), Z-score in columns (7) and (8), and finally Loans Deposits Ratio in columns (9) and (10). Regression equations were determined in the methodology above. We subdivided the specific Islamic banking services to assess the mechanism of the Islamic finance impact during the crisis. Because of the high inter-correlations among Islamic banking products, we regressed them separately in the regressions. Regarding conventional bank indicators, we used both the commercial bank base financial inclusion index and Beck et al.'s (2013) indicators to compare the impact of both proxies using them separately and together in the regression equations. We used only our constructed financial inclusion index as the proxy of conventional banks in this table. We included interaction variables with a crisis dummy for both proxies of banks for the period 2007-2009. Financial inclusion index and Islamic bank proxies were regressed with lagged dependent variables. The rest of the explanatory variables were regressed as exogenous. AR (2) denotes the Arellano-Bond test for first and second order serial correlations in first differences. Robust Standard Errors were clustered by country. Country and fixed effects were added into the regression equations. ***, **, and * show significance levels at 1%, 5%, 10 % respectively.

Dependent Variables	Equity Asset Ratio		Return on Assets		Return on Equity		Z-score		Loan Deposits Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag Equity Asset Ratio	0.275***	0.296***								
	(0.099)	(0.074)								
Lag Return on Assets			0.364**	0.352***						
			(0.203)	(0.042)						
Lag Return on Equity					0.228**	0.232**				
					(0.193)	(0.056)				
Lag Z-score							0.365***	0.370***		
							(0.203)	(0.054)		

Lag Loan Deposits Ratio									0.438**	0.483***
									(0.293)	(0.048)
Crisis Dummy	-0.565*	-0.574*	-0.321**	-0.277	0.543*	0.563*	0.201*	0.283	0.419	
	(0.108)	(0.205)	(0.145)	(0.043)	(0.125)	(0.993)	(0.102)	(0.050)	(0.557)	
Financial Inclusion Index	0.667*	0.651*	0.215***	0.516*	0.283**	0.451*	0.216*	0.543*	0.319***	0.103
	(0.153)	(0.258)	(0.050)	(0.084)	(0.043)	(0.752)	(0.044)	(0.817)	(0.024)	(0.387)
Islamic Banking Dummy	-0.521*		-0.002*		-0.043*		-0.153*		0.109**	
	(0.488)		(0.010)		(0.086)		(0.151)		(0.001)	
Zakah %		-0.036*		-0.083**		-0.322**		-0.044*		-0.327***
		(0.093)		(0.040)		(0.155)		(0.028)		(0.140)
Financial Inclusion Index_Crisis	-0.382*	-0.431*	-0.772**	-0.659*	-0.381***	-0.421*	-0.241**	-0.302	-0.065*	-0.671*
	(0.590)	(0.305)	(0.491)	(0.074)	(0.464)	(0.894)	(0.577)	(0.161)	(0.102)	(0.963)
Islamic Bank Dummy_Crisis	-0.156*		-0.092*		0.103*		-0.020*		0.044***	
	(0.086)		(0.066)		(0.064)		(0.030)		(0.013)	
Zakah %_Crisis		-0.113		-0.106*		-0.117*		-0.030*		-0.186*
		(0.165)		(0.071)		(0.293)		(0.054)		(0.237)
AR(2) Test (p-value)	[0.190]	[0.104]	[0.421]	[0.155]	[0.132]	[0.123]	[0.350]	[0.341]	[0.169]	[0.565]
Hansen test of over-identification	[0.120]	[0.460]	[0.342]	[0.050]	[0.348]	[0.250]	[0.601]	[0.276]	[0.231]	[0.247]
Number of Countries	59	59	58	58	59	59	60	60	59	59
Number of Instruments	23	23	25	25	23	23	25	25	23	23

According to the results obtained, the serial correlation tests in the first-differenced residuals were significant which means that there was a first-order serial correlation in the model. The AR (2) test results all fail to reject the null hypothesis meaning that the first-differenced error term was not second-order serially correlated for all model specifications. Additionally, the Hansen test of over-identifying restrictions was run for the validity test of the instruments. The test results could not reject the null hypothesis. In other words, the instruments were valid in all tables. Since the goal of those applications was to consolidate the robustness of the method, these steps approved that the Arellano and Bond (1991) GMM estimation method was efficient to use for our specifications.

The results in all tables show that commercial banks relatively better during the general period as expected. Regarding the comparison of both banks during the crisis, there were some significant differences in both parts. Particularly, our results showed that Islamic banks perform better during the crisis period. In particular, using our financial inclusion index as the proxy of conventional bank access, Table 6.2 indicates that conventional banks perform better during general period in terms of equity-asset ratios and stability indicators. However, during the crisis period, Islamic banks had higher equity-asset ratios and better capitalized than conventional banks.

Similarly, as seen from Table 6.3, the results are quite similar if we use Beck et al.'s conventional bank access indicators. Using total assets, non-learning assets, and fixed

assets, as the proxy of conventional banks we found evidence that conventional banks performed better during the general period. However, Islamic banks performed better during the crisis period. Therefore, we might suggest that the financial inclusion index is an efficient proxy for conventional bank access in this paper. In the meantime, we found evidence that Zakah transactions as the percentage of GDP explained the mechanism of the relative performance of Islamic banks during the crisis. Thus, it can be suggested that the redistributive products of Islamic banks might be considered as the leading factors behind the relative performance of Islamic banks.

As seen in Table 6.4, when we use all conventional bank indicators in the same regression equations, the results are consistent with the previous samples. In particular, the financial inclusion index had relatively higher impact on equity-asset ratios and stability indicators than Beck et al.'s proxies except for return on equity ratio during the general period. However, Beck et al's proxies had relatively higher impacts on equity-asset ratios and stability indicators during the crisis period with some exceptions.

Regarding the comparison of the performances of Islamic and conventional banks, we found evidence that conventional banks performed better during the general period. However, Islamic banks performed better during the crisis. In the meantime, Zakah to GDP ratio as the proxy of Islamic bank products explained the mechanism of Islamic banks performance during the crisis. As it was found in Beck et al. (2013), we found no significant differences in asset quality and stability indicators between both bank types during the crisis. However, our results were not consistent with the literature since Beck et al. (2013) and Syed Ali (2011) found no difference between Islamic and conventional banks in case of return on assets measures during the crisis. Unlike their results, we found evidence that conventional banks had higher return on assets ratios during general period while Islamic banks had higher return on assets ratios during the crisis period. Regarding the return on equity measure, we find higher return on equity ratio for Islamic banks than for commercial banks. We found evidence that this difference tent to increase during and even after the crises. Thus, it can be concluded that Islamic banks have less cut back from lending than commercial banks.

Table 6.3 Comparing Islamic and Commercial Banks during Global Financial Crisis Beck et al. (2013)' Conventional Bank Indicators only Regressions

The dependent variables are Equity Asset Ratio in columns (1) and (2), Return on Assets in columns (3) and (4), Return on Equity in columns (5) and (6), Z-score in columns (7) and (8), and finally Loans Deposits Ratio in columns (9) and (10). Regression equations were determined in the methodology section above. We subdivided the specific Islamic banking services to assess the mechanism of the Islamic finance impact during the crisis. Because of the high inter-correlations among Islamic banking products, we regressed them separately in the regressions. Regarding conventional bank indicators, we used both the commercial bank base financial inclusion index and Beck et al.'s (2013) indicators to compare the impact of both proxies, using them separately and together in the regression equations. We used only Beck and other's indicators, which are total assets, non-learning assets, and fixed assets, as the proxy of conventional

banks in this table. We included interaction variables with a crisis dummy for both proxies of banks for the period 2007-2009. Beck et al.'s conventional bank proxies and Islamic bank proxies were regressed with lagged dependent variables. The rest of the explanatory variables were regressed as exogenous. AR (2) denotes the Arellano-Bond test for the first and second order serial correlations in first differences. Robust Standard Errors were clustered by country. Country and fixed effects are added into the regression equations. ***, **, and * show significance levels at 1%, 5%, 10 % respectively.

Dependent Variables	Equity Asset Ratio		Return on Assets		Return on Equity		Z-score		Loan Deposits Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag Equity Asset Ratio	0.266*	0.248**								
	(0.187)	(0.194)								
Lag Return on Assets			0.371***	0.370***						
			(0.013)	(0.014)						
Lag Return on Equity					0.318***	0.376**				
					(0.102)	(0.164)				
Lag Z-score							0.271***	0.269***		
							(0.084)	(0.084)		
Lag Loan Deposits Ratio									0.400***	0.397***
									(0.078)	(0.079)
Crisis Dummy	0.145	0.287*	-0.134*	-0.281	-0.093*	-0.195***	0.156	0.121*	0.146*	0.108
	(0.090)	(0.107)	(0.054)	(0.220)	(0.231)	(0.754)	(0.254)	(0.171)	(0.069)	(0.114)
Ln(Total Assets)	0.207*	0.215*	-0.122	0.124*	0.354**	0.358*	0.027*	-0.026	0.110*	0.094*
	(0.132)	(0.133)	(0.100)	(0.098)	(0.033)	(0.140)	(0.042)	(0.042)	(0.145)	(0.143)
Non-loan Earnings Assets	0.216	0.298**	-0.062	0.061*	0.213*	0.219*	0.046*	0.142*	0.547***	0.559**
	(0.198)	(0.136)	(0.065)	(0.072)	(0.720)	(0.028)	(0.091)	(0.110)	(0.286)	(0.259)
Fixed Assets	0.110	0.118*	0.177	0.175	0.194	0.181*	0.153***	0.155***	0.392	0.335***
	(0.085)	(0.087)	(0.064)	(0.065)	(0.278)	(0.190)	(0.035)	(0.0035)	(0.112)	(0.115)
Islamic Banking Dummy	-0.231**		-0.051		-0.148*		-0.066		-0.165***	
	(0.188)		(0.056)		(0.687)		(0.112)		(0.347)	
Zakah %		-0.213*		0.047**		-0.103*		-0.033*		-0.618***
		(0.152)		(0.068)		(0.794)		(0.174)		(0.180)
Ln(Total Assets)_Crisis	-0.015*	-0.022	-0.101*	-0.002**	-0.111*	-0.118*	-0.112*	-0.088	-0.035*	-0.050*
	(0.038)	(0.046)	(0.006)	(0.006)	(0.119)	(0.062)	(0.015)	(0.011)	(0.047)	(0.047)
Non-loan Earnings Assets_Crisis	-0.143*	-0.077*	-0.101*	-0.101*	-0.233	-0.228*	-0.220*	-0.049	0.010	-0.167*
	(0.171)	(0.179)	(0.058)	(0.065)	(0.787)	(0.434)	(0.098)	(0.080)	(0.315)	(0.218)
Fixed Assets_Crisis	-0.046	-0.132*	-0.001	0.002	-0.046*	-0.216**	-0.108	0.019*	-0.058*	-0.114
	(0.055)	(0.056)	(0.007)	(0.008)	(0.120)	(0.089)	(0.015)	(0.022)	(0.047)	(0.072)
Islamic Bank Dummy_Crisis	-0.110*		0.025**		0.355*		-0.013**		-0.032*	
	(0.092)		(0.021)		(0.451)		(0.058)		(0.182)	
Zakah %_Crisis		0.102*		0.018*		0.366*		0.042*		-0.032**
		(0.010)		(0.026)		(0.389)		(0.066)		(0.211)
AR(2) Test (p-value)	[0.120]	[0.140]	[0.346]	[0.065]	[0.310]	[0.201]	[0.350]	[0.121]	[0.150]	[0.245]
Hansen test of over-identification	[0.246]	[0.430]	[0.542]	[0.080]	[0.148]	[0.320]	[0.431]	[0.651]	[0.432]	[0.244]
Number of Countries	59	59	58	58	59	59	60	60	59	59
Number of Instruments	33	33	35	35	33	33	35	35	33	33

Table 6.4 Comparing Islamic and Commercial Banks during Global Financial Crisis All Conventional Bank Indicators Regressions

The dependent variables are Equity Asset Ratio in columns (1) and (2), Return on Assets in columns (3) and (4), Return on Equity in columns (5) and (6), Z-score in columns (7) and (8), and finally Loans Deposits Ratio in columns (9) and (10). Regression equations were determined in the methodology section above. We subdivided the specific Islamic banking services to assess the mechanism of the Islamic finance impact during the crisis. Because of the high inter-correlations among Islamic banking products, we regressed them separately in the regressions. Regarding conventional bank indicators, we used both the commercial bank base financial inclusion index and Beck et al.'s (2013) indicators to compare the impact of both proxies, using them separately and together in the regression equations. We used both our constructed financial inclusion index and Beck and other's indicators as the proxy of conventional banks in this table. We included interaction variables with a crisis dummy for both proxies of banks for the period 2007-2009. All proxies of financial inclusion and Islamic bank were regressed with lagged dependent variables. The rest of the explanatory variables were regressed as exogenous. AR (2) denotes the Arellano-Bond test for the first and second order serial correlations in first differences. Robust Standard Errors were clustered by country. Country and fixed effects were added into the regression equations. ***, **, and * show significance levels at 1%, 5%, 10 % respectively.

Dependent Variables	Equity Asset Ratio		Return on Assets		Return on Equity		Z-score		Loan Deposits Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag Equity Asset Ratio	0.176*	0.175*								
	(0.193)	(0.193)								
Lag Return on Assets			0.369***	0.370***						
			(0.015)	(0.015)						
Lag Return on Equity					0.309***	0.310***				
					(0.156)	(0.156)				
Lag Z-score							0.264***	0.264***		
							(0.085)	(0.085)		
Lag Loan Deposits Ratio									0.383***	0.381**
									(0.080)	(0.081)
Crisis Dummy	-0.186*	-0.243	-0.276	-0.288*	-0.201	-0.113**	-0.345*	-0.339	-0.178**	-0.159*
	(0.123)	(0.488)	(0.143)	(0.175)	(0.098)	(0.271)	(0.287)	(0.324)	(0.109)	(0.211)
Financial Inclusion Index	0.336*	0.233	0.355*	0.161*	0.265*	0.125	0.403*	0.286*	0.395**	0.277*
	(0.048)	(0.058)	(0.047)	(0.007)	(0.741)	(0.017)	(0.697)	(0.635)	(0.927)	(0.687)
Ln(Total Assets)	0.258*	0.262	0.120	0.123*	0.465	0.450*	0.269*	0.161	0.192*	0.183*
	(0.180)	(0.184)	(0.102)	(0.104)	(0.325)	(0.298)	(0.053)	(0.056)	(0.185)	(0.185)
Non-loan Earnings Assets	0.125	0.113*	0.246	0.245**	0.338**	0.321	0.193	0.167*	0.329*	0.203**
	(0.183)	(0.188)	(0.062)	(0.063)	(0.921)	(0.895)	(0.085)	(0.087)	(0.280)	(0.288)
Fixed Assets	0.069	0.112	0.177*	0.173*	0.154	0.173*	-0.096	0.140***	0.250**	0.270**
	(0.082)	(0.083)	(0.075)	(0.068)	(0.209)	(0.202)	(0.040)	(0.036)	(0.015)	(0.115)
Islamic Banking Dummy	-0.042*		-0.200*		-0.160*		-0.379**		-0.207*	
	(0.571)		(0.181)		(0.683)		(0.630)		(0.894)	
Zakah %		-0.227*		-0.069*		-0.175*		-0.054*		-0.244*
		(0.179)		(0.070)		(0.366)		(0.296)		(0.950)
Financial Inclusion Index_Crisis	-0.494*	-0.363	-0.571*	-0.481*	-0.371*	-0.429	-0.985*	-0.482*	-0.230*	-0.115
	(0.532)	(0.871)	(0.305)	(0.453)	(0.047)	(0.925)	(0.250)	(0.435)	(0.638)	(0.984)
Ln(Total Assets)_Crisis	-0.118*	-0.128	-0.102*	-0.102	-0.115	-0.113*	-0.107*	-0.114*	-0.014	-0.117*
	(0.110)	(0.114)	(0.009)	(0.009)	(0.127)	(0.125)	(0.020)	(0.020)	(0.065)	(0.066)
Non-loan Earnings Assets_Crisis	-0.103	0.132*	-0.117	-0.118*	-0.099*	-0.005	-0.245*	-0.245	-0.297*	-0.292*
	(0.160)	(0.170)	(0.053)	(0.054)	(0.395)	(0.401)	(0.092)	(0.095)	(0.303)	(0.309)
Fixed Assets_Crisis	0.050	0.036	-0.084*	-0.074*	-0.025*	-0.026**	-0.105*	-0.106	-0.087*	-0.186*

	(0.146)	(0.046)	(0.007)	(0.008)	(0.082)	(0.083)	(0.014)	(0.015)	(0.047)	(0.047)
Islamic Bank Dummy_Crisis	-0.036*		0.171*		-0.001*		-0.083**		-0.036*	
	(0.142)		(0.128)		(0.342)		(0.241)		(0.730)	
Zakah %_Crisis		-0.055*		0.068**		-0.022*		-0.084*		-0.029**
		(0.210)		(0.065)		(0.241)		(0.503)		(0.599)
AR(2) Test (p-value)	[0.290]	[0.109]	[0.406]	[0.055]	[0.110]	[0.401]	[0.450]	[0.321]	[0.169]	[0.345]
Hansen test of over-identification	[0.136]	[0.410]	[0.992]	[0.090]	[0.948]	[0.290]	[0.501]	[0.221]	[0.532]	[0.244]
Number of Countries	59	59	58	58	59	59	60	60	59	59
Number of Instruments	43	43	45	45	43	43	45	45	43	43

Finally, as consistent with Beck et al.'s results, we found that Islamic banks had higher z-scores and loan-deposit ratios during the crisis period. As the modification of their results, we assessed the mechanisms of this relative performance as the Zakah to GDP ratios of Islamic banks. The remarkable relative performance of Islamic banks in predominantly Muslim population countries during the global financial crisis can be explained as the nature of Islamic banking services in such countries.

Particularly, Islamic banking activities, especially the redistributive instruments, tend to have closer relationship between the real economic sector because of the nature of profit and loss sharing principle services and risk sharing opportunities. The risk and profit sharing transactions such as Murabahat and Mudabara are the major sources of the Islamic banks in countries where Islamic banks are the main financial actors. Hence, Islamic banking services, specifically Murabahat, Mudabara, Zakah, loans, and deposits services stood out during the global crisis in countries like Kuwait, Malaysia, Qatar, and Saudi Arabia.

In summary, Islamic financial institutions are better capitalized especially during global financial crises have higher equity-asset ratios, and less likely to disintermediate during global crises. Thus, higher capitalization and equity-asset ratios explain the relative performance of Islamic banks during the crises. On the other hand, these results mentioned above were consistent with the results of Beck et al. (2013) since they found Islamic banks were better in capitalization during the crisis period.

However, our results were not consistent with the results of Syed Ali (2011) since they found lower ROE levels in case of Islamic banks compared to commercial banks. Furthermore, we found significantly higher z-scores for Islamic banks than conventional banks in our sample. This result was not consistent with the results in Beck et al. (2013). Regarding the products of Islamic banks, to assess the mechanisms of this relative performance, Islamic bank Zakah to GDP ratio performed better in equity-asset ratios and capitalization indicators during the crisis. Hence, it can be concluded that the redistributive instruments of Islamic banks explain the mechanism of this performance.

7. Conclusions

Comparing the relative performances of Islamic and commercial banks during the crisis period, our findings suggested that, conventional banks performed better during the general period. However, Islamic banks significantly perform better in equity-asset ratios and stability indicators during the crisis period. Meanwhile, exploring the mechanisms by which Islamic finance provides a better performance during the global crisis, Islamic bank Zakah to GDP ratio in terms of equity-asset ratios and capitalization of banks explained the performance of Islamic banks.

Furthermore, using both the financial inclusion index and Beck et al.'s proxies for conventional bank access to compare the impacts of these indicators, we found evidence that both proxies had similar results in different estimation models. Thus, we might suggest that the constructed financial inclusion index is an efficient estimator for conventional bank access. In particular, the financial inclusion index had higher equity-asset ratios and stability indicators during the general period. However, Beck et al.'s proxies, total assets, non-loan earning assets, and fixed assets, had higher stability and asset quality ratios during the crisis period.

Regarding the results of this paper, policymakers should consider providing various Shari'a-compliant financial services which are good alternatives for conventional banking services. Providing such services would bring more people those who have concerns about using conventional banking in the formal financial system. Removing caps of interest rates and strengthening customer protection rules would help to facilitate this policy mission. In the meantime, 'institutionalization' is considered a vital process for Islamic redistributive instruments around the world. Providing specific institutions of Islamic redistributive services would be a long-term policy target for policymakers.